

Turf and Pest Management

Water Quality Factsheet for Permit Applicants

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This factsheet is a summary of information compiled by Water Quality Program staff. It is not a requirement by the Coastal Commission, and it may be superseded by site-specific information.

Give Turf a Chance

Turf provides a forgiving and resilient surface for many recreational activities. Even though the California drought has drawn attention to the high water requirements of grass, turf is essential to some developments such as athletic fields and golf courses, and lawns are the quintessential open space vegetation in residential development. Artificial turf offers significant water savings and has low maintenance requirements compared to living turf, but poses potential adverse environmental and human health impacts that should be carefully considered. If living turf is proposed for a development project, a turf management plan should be prepared that provides appropriate guidance for turf design and management, and dictates conservative irrigation practices and minimizing chemical use.

Besides having high irrigation requirements, fertilizers and pesticides are typically used liberally to maintain turf in optimum condition. Soil amendments and chemical fertilizers are typically applied to turf to promote plant growth, along with various herbicides, insecticides, and rodenticides to control unwanted populations of plants, insects, and rodents, respectively.



Turf maintenance needs are notably higher than those of other landscaping plants, and can be out of sync with promoting xeriscapes (which reduce the need for irrigation) or protecting natural habitats and Environmentally Sensitive Habitat Areas (ESHA). Coastal water quality can be degraded when turf and pest management chemicals appear in irrigation and stormwater runoff, or leach into the groundwater table.

In the State Water Resource Control Board's purview, turf is categorized as one of many types of landscaping that is 'self-treating' for stormwater management, and therefore is not required to have stormwater Best Management Practices (BMPs). However, given the potentially high water and

chemical use associated with turf, it usually makes good sense to include a turf management plan to ensure water quality protection in coastal development projects. A turf management plan essentially provides water quality 'source control' BMPs to keep potential pollutants separate from runoff.

Because turf is installed for a variety of purposes, and because hydrologic and ecological conditions vary from place to place, a turf management plan normally should be tailor-made for the development. The level of detail provided in a turf management plan should be commensurate with the project. Large areas of turf, such as a golf course or playing field, should have a more detailed and stringent plan than is needed for a small lawn at a single-family residence.

Typical Content of a Turf and Pest Management Plan

Planning and Design

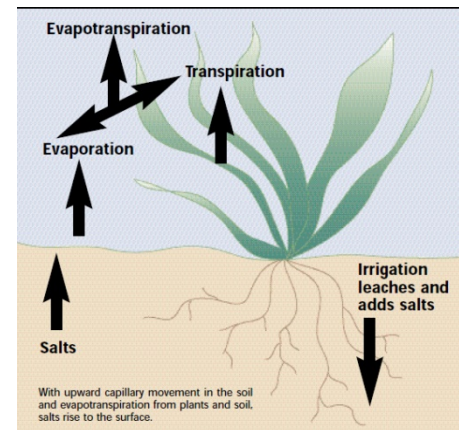
- **Turf Area Substrate**
- **Grass Species Selection**

Essential to the design of the turf area is the substrate, which may need to be modified to promote drainage and infiltration, and to help root structure efficiency. Turf substrate design commonly includes grading, and amendment and replacement of site soils, to create the ideal conditions for turf health. A suite of grasses should be selected according to site conditions, climate, and rainfall, and typically reflect the most vigorous species with the lowest water needs.

General Maintenance Practices

- **Mowing and trimming**
- **Irrigation**

Mowing and trimming plans set standards for optimal water retention for the type of use planned for the turf. Modern mowing equipment allows recycling of cut grass, which replenishes nutrients without adding fertilizers, and provides better conditions for microorganisms and earthworms. Over-watering is not just wasteful, but also tends to flush nutrients and chemicals out of reach of the rooting zone, and may transport these pollutants into the groundwater table or into waterways via dry-weather runoff.



Cultural Care

- **Salt buildup**
- **Fertilization**
- **Aeration and thatch removal**
- **Weed eradication**

Soil testing should be used to assess and manage the buildup of salt in turf soils, which is a problem that develops (1) when evapotranspiration exceeds rainfall and irrigation; or (2) when hard water is used to irrigate the turf (especially true for recycled water); or (3) due to the salt content in fertilizers. Soil testing should also be used to check for optimum fertilizer content. Nitrogen



stimulates leaf growth, potassium encourages seed-ripening and stress-tolerance, and phosphorus enhances stem and root strength. Potassium and phosphorus also impart resistance to insects and diseases. Typically, the soil culture is managed as a whole to maximize turf health while minimizing chemical application.

Proper aeration and thatch removal allows applied water and fertilizer to penetrate to the turf roots, and allows flushing of salts. Weeds can be controlled by promoting vigorous turf growth, by manual removal, or with herbicides. When herbicides are used, localized applications of the most effective and environmentally-benign herbicides during optimal weather conditions should be stipulated in the turf management plan.

Integrated Pest Management

- **Pest tolerance thresholds**
- **Pest management strategies**

Integrated Pest Management (IPM) is the preferred strategy for dealing with turf pests, which include plants (weeds), vertebrates (birds, rodents, or other mammals), invertebrates (insects, ticks, mites, or snails), nematodes, or pathogens that cause disease (bacteria, viruses, or fungi). According to the University of California *Statewide Integrated Pest Management Program* (<http://www.ipm.ucdavis.edu/GENERAL/whatisipm.html>):

Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.

IPM strategies include identifying problem pests and setting tolerance goals (e.g., how many gopher holes, or sprained ankles from gopher holes, are acceptable). As applied to turf pest management, IPM promotes methods that control insects, rodents, lawn diseases, and weed populations to a level where the turf can be maintained in a condition suitable for its intended use. Pest populations may thrive with access to turf as a food source; IPM seeks to control pests' access to the turf, and can obviate the use of chemical treatments. If monitoring indicates pesticides are needed, IPM promotes the selection of the most environmentally-friendly approach.

Rodenticides, pesticides, and other chemicals commonly used for turf management are problematic for the environment, and not surprisingly have been detected in both agricultural runoff and, increasingly, in urban runoff. The unintended consequence of using rodenticides, for example, is troubling, especially in close proximity to ESHA or coastal waters. Many local regulations, such as in Local Coastal Programs and Long-Range Development Plans, have specified a complete ban on using certain rodenticides near ESHA, or have required that a qualified biologist provide advice on rodent eradication methods that are protective of native animal populations.

What makes anticoagulant rodenticides so dangerous to wildlife is that although a single feeding of poison will eventually kill the target rodents, it takes four to seven days for the rodent to die. During this time rodents can consume more bait, raising the level of toxins in their bodies to a

dose that is lethal to the larger animals that eat rodents and carrion, such as hawks, owls, foxes, raccoons, opossums, skunks and coyotes.

Rodenticide and insecticide poisons should always be the last resort. The acceptable rodenticide de jour, from neurotoxins to anticoagulants, have all eventually been recognized as posing an unacceptable risk to animal populations that feed on rodents, to house pets, and to water quality. However, any proposed new alternatives should be carefully considered. For example, powdered corn cob, which can cause lethal dehydration in rodents, seems to be a viable alternative that is biodegradable, poses no risk of water contamination, and has little threat of toxicity to children, pets, livestock, or birds, including through secondary poisoning (i.e., animals eating rodents killed by this method).

Example Permit Requirements for a Turf and Pest Management Plan

- *With 3 pest management alternatives*

1. Example with (c): *Chemical pest controls as a last resort*

To minimize polluted runoff from the site in order to protect coastal water quality:

- a) A Turf and Pest Management Plan shall be prepared that gives precedence to the use of non-chemical strategies instead of chemical strategies for managing weedy species and pests on site.
- b) Turf management practices shall follow state-of-the-art environmental methods (such as Integrated Pest Management) to minimize water use, fertilizer and herbicide application, and chemical pesticide use, to the maximum extent feasible.
- c) Chemical pest control strategies shall only be employed after all other non-chemical strategies have proven ineffective.
- d) An annual summary report shall be prepared by the applicant, and provided to the Coastal Commission upon request, that documents the implementation of the Turf and Pest Management Plan each year.

2. Alternative example for (c): *No anticoagulant rodenticides allowed*

- c) Use of pesticides and herbicides shall be minimized. Non-chemical strategies such as use of appropriate biopesticides, lining the playing field to exclude rodents, and using grass cultivars that are pest-resistant, shall be incorporated in the Turf and Pest Management Plan. No rodenticides containing anticoagulant compounds (including, but not limited to, Warfarin, Brodifacoum, Bromadiolone, or Diphacinone) shall be used.

3. Another alternative example for (c): *Minimize impacts of rodenticides on non-target species*

- c) The impacts on non-target species from any rodenticide used shall be minimized to the maximum extent feasible. Rodent control areas shall be evaluated for the potential presence of non-target species – including special status species – and the rodent control methods tailored to minimize non-target species impacts. When chemical pest control is required, the use shall be guided by label restrictions and any advisories published by the California Department of Pesticide Regulation or the County Agricultural Commission.

In areas occupied by burrowing owls, fumigants shall not be used unless specifically determined safe by a qualified biologist. If necessary, alternative methods of rodent control to be used shall be determined by a qualified biologist. The rodenticide applicator shall remove carcasses of poisoned animals to minimize secondary poisoning of raptors or other wildlife. Carcass surveys and disposal shall be performed in the treated area and surrounding areas beginning on the third day following the initial deployment of toxic baits. Any carcasses shall be disposed of in a manner inaccessible to wildlife. Carcass surveys shall continue for at least five days after toxic baiting has ceased, and continue thereafter until no more carcasses are found.

For Additional Information

- ❖ *Environmental Management Practices for Golf Courses* – Factsheet by Audubon International.
<http://www.auduboninternational.org/Resources/Documents/Environmental%20Management%20Guidelines%20for%20Golf.pdf>
- ❖ *Environmental Principles for Golf Courses in the United States* – Factsheet by Golf Course Superintendents Association of America (perhaps not as good as Audubon’s factsheet).
<http://www.gcsaa.org/course/communication/golfcoursefacts/environmental-principles-for-golf-courses-in-the-united-states>
- ❖ *Integrated Pest Management Plan (2012)* – Plan by Santa Barbara City College.
<http://www.sbccc.edu/facilities/SBCC%20IPM%20Plan.pdf>
- ❖ *Synthetic Turf: Health and Environmental Impacts* – Studies listed on the website of the Center for Sports Surface Research at Penn State University.
<http://plantscience.psu.edu/research/centers/ssrc/research/synthetic-turf-health>
- ❖ *Turfgrass: UC IPM Pest Management Guidelines for Agriculture* – Publication by University of California’s *Statewide Integrated Pest Management Program*.
<http://www.ipm.ucdavis.edu/PMG/selectnewpest.turfgrass.html>